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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/565,094
Filing Date: January 17, 2007
Appellant(s): BLYTH ET AL.

Louis C. Frank
Reg. No. 60,043
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 11/24/10 appealing from the Office action mailed 6/24/10.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 1-19 are finally rejected.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being

maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

5,989,923	Lowe et al.	11-1999
5,499,117	Yin et al.	3-1996
GB 2 054 995 A	Stephens et al.	2-1981
6,483,611	Mizutani et al.	11-2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-6 and 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lowe et al. (5,989,923), Stephens et al. (GB 2054995 A) and Yin et al. (5,499,117) of record. These rejections are set forth in the Office Action dated 6/24/10, and copied *infra*.

Consider claim 1, Lowe et al. disclose (e.g. figure 1a) an apparatus for detecting an analyte, comprising: a sensor (9, sensor) comprising a medium (10, support medium) and, disposed therein, a hologram (17, hologram) wherein an optical characteristic of the hologram changes as a result of a variation of a physical property of the medium resulting from interaction with the analyte, and wherein the hologram is

formed as a non-planar mirror (reflection hologram with fringes that can be flat or curved) [col. 4, lines 32-39, col. 10, lines 4-39]. However Lowe et al. do not disclose a unit of optical fibers for transmitting light to and from the hologram or that the non-planar surface is concave, convex, capable of effecting retroreflection, recorded using one or more reflective beads, or a prism. Lowe et al. and Stephens et al. are related as devices comprising holograms. Stephens et al. teach (e.g. figures 1-3) a unit of optical fibers (3-14, optical fibers) for transmitting light to and from a hologram (17, reflecting surface) [pg. 2, lines 42-103]. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the device of Lowe et al., as taught by Stephens et al., in order to guide light with the narrowest possible bandwidth to the holographic surface so that the colors reflected are indicative of the part of the reflector from which it is received.

However, the modified Lowe et al. reference does not disclose that the non-planar surface is convex, concave, capable of effecting retroreflection, recorded using one or more reflective beads, or a prism. Lowe et al., Stephens et al. and Yin et al. are related as devices utilizing holograms. Yin et al. teach a non-planar surface that is convex and/or concave (e.g. figures 1-4) [col. 2, lines 7-56]. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the hologram substrate of the modified Lowe et al. reference to have curvature, as taught by Yin et al., in order to have a reflection hologram formed on a curved surface without distorting the optical properties of the hologram layer to increase the number of applications possible for the holographic element.

Consider claim 2, the modified Lowe et al. reference discloses (e.g. figure 4 of Stephens et al.) an apparatus wherein the hologram is formed as a concave mirror [pg. 3, lines 18-22].

Consider claim 3, the modified Low et al. reference discloses (e.g. figure 1 of Yin et al.) an apparatus wherein the hologram is formed as a convex surface [col. 2, lines 7-56 of Yin et al.].

Consider claim 4, the modified Lowe et al. do not disclose that the hologram is formed as a corner cube prism. Note that the Court has held that a mere change in shape of an element is generally recognized as being within the level of ordinary skill in the art when the change in shape is not significant to the function of the combination, see **In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)**. All mirrors, whether they be concave, convex or cube-corner shaped, are capable of effecting retroreflection. Further, one would have been motivated to have the hologram be formed as a corner cube prism in order to reduce scattering of light during reflection.

Consider claim 5-6, Lowe et al. disclose (e.g. figure 1a) a method for the production of an apparatus comprising a sensor (9, sensor) comprising a medium (10, support medium) and, disposed therein, a hologram (17, hologram), wherein an optical characteristic of the hologram changes as a result of a variation of a physical property of the medium resulting from interaction with the analyte, and wherein the hologram is formed as a non-planar mirror (reflection hologram with fringes that can be flat or curved); wherein the method comprises forming, in a non-planar medium (can be flat or curved), a hologram, as a non-planar mirror (reflection hologram with fringes that can be

flat or curved), that is recorded using a planar mirror [col. 4, lines 32-39, col. 10, lines 4-39]. However Lowe et al. do not disclose that the apparatus comprises a unit of optical fibers or that the non-planar surface is concave, convex, capable of effecting retroreflection, recorded using one or more reflective beads, or a prism. Lowe et al. and Stephens et al. are related as devices comprising holograms. Stephens et al. teach (e.g. figures 1-3) an apparatus comprising a unit of optical fibers (3-14, optical fibers) [pg. 2, lines 42-103]. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the device of Lowe et al., as taught by Stephens et al., in order to guide light with the narrowest possible bandwidth to the holographic surface so that the colors reflected are indicative of the part of the reflector from which it is received.

However, the modified Lowe et al. reference does not disclose that the non-planar surface is convex, concave, capable of effecting retroreflection, recorded using one or more reflective beads, or a prism. Lowe et al., Stephens et al. and Yin et al. are related as devices utilizing holograms. Yin et al. teach a non-planar surface that is convex (e.g. figure 1) [col. 2, lines 7-56]. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the modified Lowe et al., reference, in view of Yin et al., in order to have a curved surface without distorting the optical properties of the hologram layer.

Consider claim 14, Lowe et al. disclose (e.g. figure 1a) a method for the detection of an analyte, which comprises remotely interrogating, with light, the holographic element of a sensor (9, sensor) comprising a medium (10, support medium) and,

disposed therein, a hologram (17, hologram), wherein an optical characteristic of the hologram changes as a result of a variation of a physical property of the medium resulting from interaction with the analyte, and wherein the hologram is formed as a non-planar mirror (reflection hologram with fringes that can be flat or curved); wherein the method further comprises detecting any change in an optical characteristic of the sensor [col. 4, lines 32-39, col. 10, lines 4-39]. However Lowe et al. do not disclose that the interrogating is via a unit of optical fibers that transmits the light to and from the hologram or that the non-planar surface is concave, convex, capable of effecting retroreflection, recorded using one or more reflective beads, or a prism. Lowe et al. and Stephens et al. are related as devices comprising holograms. Stephens et al. teach (e.g. figures 1-3) interrogating via a unit of optical fibers (3-14, optical fibers) that transmits the light to and from a hologram (17, reflecting surface) [pg. 2, lines 42-103]. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the device of Lowe et al., as taught by Stephens et al., in order to guide light with the narrowest possible bandwidth to the holographic surface so that the colors reflected are indicative of the part of the reflector from which it is received.

However, the modified Lowe et al. reference does not disclose that the non-planar surface is convex, concave, capable of effecting retroreflection, recorded using one or more reflective beads, or a prism. Lowe et al., Stephens et al. and Yin et al. are related as devices utilizing holograms. Yin et al. teach a non-planar surface that is convex (e.g. figure 1) [col. 2, lines 7-56]. It would have been obvious to a person of

ordinary skill in the art at the time the invention was made to modify the modified Lowe et al., reference, in view of Yin et al., in order to have a curved surface without distorting the optical properties of the hologram layer.

Consider claim 15, Lowe et al. teach (e.g. figure 1a) a method wherein the light source is collimated (12, laser light rays from a laser source) [col. 10, lines 4-14].

Consider claims 16-19, the modified Lowe et al. reference discloses a recording surface that is formed as a non-planar surface (e.g. figure 1 of Yin et al.) [col. 2, lines 7-40 of Yin et al.].

Claims 7-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lowe et al. (5,989,923) in view of Stephens et al. (GB 2065995 A) and Yin et al. (5,499,117) as applied to claims 1 and 5 above, and further in view of Mizutani et al. (6,483,611) of record. These rejections are set forth in the Office Action dated 6/24/10, and copied *infra*.

Consider claims 7-10, the modified Lowe et al. do not specifically disclose a sensor wherein the hologram is formed using a planar, non-planar, concave mirror or a mirror capable of effecting retroreflection. Lowe et al., Stephens et al. and Mizutani et al. are related as devices utilizing holograms. Mizutani et al. teach (e.g. figure 1-2) a sensor wherein the hologram is formed using a planar, non planer and concave mirrors [col. 1, lines 59-67, col. 2, lines 7-9, 65-68, col. 3, lines 1-11 and col. 15, lines 26-53]. Note that a retro reflector is defined as a device that reflects light back to its source. As such, the mirrors of Mizutani et al. will function as retroreflectors. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to

modify the device of Lowe et al., as taught by Mizutani et al., in order to allow for magnification or reduction of an image formed from the hologram element.

Consider claim 11, the modified Lowe et al. reference does not disclose that the hologram is recorded using a corner cube prism. Note that the Court has held that a mere change in shape of an element is generally recognized as being within the level of ordinary skill in the art when the change in shape is not significant to the function of the combination, see **In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)**. All mirrors, whether they be concave, convex or cube-corner shaped, are capable of effecting retroreflection. Further, one would have been motivated to have the hologram be recorded using a corner cube prism in order to reduce scattering of light during reflection.

Consider claim 12, the modified Lowe et al. reference does not disclose that the hologram is recorded using reflective beads. Note that the Court has held that a mere change in shape of an element is generally recognized as being within the level of ordinary skill in the art when the change in shape is not significant to the function of the combination, see **In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)**. Further, one would have been motivated to have the hologram be recorded using reflective beads in order to reduce scattering of light during reflection and increase reflective capabilities.

Consider claim 13, the modified Lowe et al. reference discloses (e.g. figure 2 of Mizutani et al.) a method wherein the hologram is recorded using a lens (542, object lens) placed between the light source and the medium [col. 2, lines 19-35 of Mizutani et al.].

(10) Response to Argument

The Appellants' arguments and remarks filed 11/24/10, in response to the final rejection dated 6/24/10, have been fully considered, however they are not found persuasive.

A. Response to claims 1-6 and 14-19 under 35 U.S.C. 103 (a) (see pages 3-9 of Appellants' brief filed 11/24/10)

It is the Appellants' belief that the prior art of record does not teach, or reasonably suggest "a hologram formed as a non-planar mirror." More specifically Appellants argue, as discussed in the Declaration under 37 C.F.R. §1.132 of Christopher Robin Lowe (herein after the Lowe Declaration), that "a non-planar mirror is a particular embodiment of particular utility in the context of the present invention" and that although the prior art teaches curved or flat fringe planes, "that is true of almost all holograms." It is also the belief of Appellants, as noted in the Lowe Declaration, that "the general disclosure of Lowe et al. is quite different from the creation of curved fringes as a result of using a reflector with a well defined geometry which gives rise to controlled geometrical fringes." It is the belief of the Appellants that the "controlled geometrical fringes...are used to deliberately manipulate the incident light" and the deliberate manipulation is a necessary requirement for the device and method of the instant invention.

However, it is the belief of the Examiner that Lowe et al., in view of Stephens et al. and Yin et al. teach the claimed apparatus and method for detecting an analyte.

As previously stated in Section 2 of the Office Action dated 5/1/09, the Examiner respectfully disagrees with Appellants' arguments, and reference to the Lowe Declaration as evidence, that the prior art does not disclose a hologram formed as a non-planar mirror. The Examiner notes that a non-planar mirror hologram can be formed by multiple methods. A non-planar recording surface can form a non-planar mirror hologram or a reflection hologram can be formed with curved fringes. In the latter case, a non-planar hologram can be recorded on a planar substrate. The hologram, upon interrogation, functions as a non-planar mirror hologram because of how the hologram/curved fringes are reconstructed. *The claims do not specify that the recording surface of the mirror hologram is formed as a non-planar surface.* Thus, the reflection holograms such as formed by Lowe et al., can have fringes that are curved, so that the holograms can function as non-planar mirror holograms.

In response to Appellants' argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., that controlled geometrical fringes are used to deliberately manipulate the incident light) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

It is also the Appellants' belief that the Stephens et al. reference has been misinterpreted such that there is no teaching or suggestion in the Stephens et al. reference of guiding narrow band light to a holographic surface. Appellants' additionally argue that if light with the narrowest possible bandwidth was guided to a surface of a

holographic sensor, in most cases there would be no reflection. It is the belief of the Appellants that a person of ordinary skill in the art would not have been motivated to modify the Lowe et al. reference in view of Stephens et al. without the benefit of hindsight.

In response to Appellants' arguments that there is no teaching or suggestion in the Stephens et al. reference of guiding narrow band light to a holographic surface the Examiner respectfully disagrees. Stephens et al. is directed to (e.g. figures 1-3) a bundle of optical fibers (3-14, 18-29 optical fibers) that are used for transmitting light to and from a hologram surface (17, reflecting surface which is preferably a holographic reflector; pg. 2, lines 66-67). Narrow band light is reflected from a first holographic reflecting surface (2), combined for transmission through a single path and then applied to holographic reflecting surface (17) via additional optical fibers. The Examiner respectfully notes that the phrase " to guide light with the narrowest possible bandwidth" as recited by the Examiner in Section 4 of the Office Action dated 6/24/10 is meant to describe the ability of the optical fibers to guide light, which has the narrowest possible bandwidth needed, to and from a holographic surface. As such, the motivation given by the Examiner to combine the Lowe et al. and Stephen et al. references is valid and the teachings of Stephens et al. have not been misinterpreted as Appellants suggest.

Further, in regards to the argument that if light with the narrowest possible band width was guided to the surface of a holographic sensor, in most cases there would be no reflection, the Examiner respectfully disagrees. The optical fibers (3-15 and 18-29) of Stephens et al. each direct a bandwidth of light to the holographic reflecting surfaces

2 and 17. The wavelengths reflected are arranged to be mutually exclusive so that the color is indicative of the part of the reflector from which it was received. The reflected light is received by optical fibers (9-14) and then combined for transmission with a single optical light path 15 and then reflected again upon incidence with a second holographic reflective surface (17). Stephens et al. specifically disclose that a reflection does occur; even light with a narrowest possible bandwidth (i.e. the narrowest possible bandwidth needed) to be further guided by optical fibers to a sensor for detection.

Additionally, in response to Appellants' arguments that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In this instance, a person having ordinary skill in the art would have been motivated to modify the device of Lowe et al., in view of Stephens et al., so that light can be guided with a very narrowband width to the holographic surface so that the colors reflected are indicative of the part of the reflector from which it is received.

It is also the Appellants' belief that the combination of Lowe et al., Stephens et al., and Yin et al., do not teach a non-planar surface as currently claimed. It is the belief of the Appellants' that the Yin et al. reference would reconstruct a convex or concave shape only if the hologram was recorded in reflection mode.

However, it is the belief of the Examiner that Lowe et al, in view of Stephens et al. and Yin et al. teach a hologram formed as a convex or concave non-planar mirror.

As noted above, a non-planar mirror hologram can be formed by multiple methods. A non-planar recording surface can form a non-planar mirror hologram or a reflection hologram can be formed with curved fringes. The Examiner respectfully notes that the claims as currently presented do not preclude either interpretation of how a non-planar mirror can be formed. Appellants argue that only if the hologram of Yin et al. was recorded in reflection mode would it "give rise to fringes which would reconstruct a convex or concave mirror." The Examiner respectfully notes that the features upon which applicant relies (i.e., that a convex or concave mirror is reconstructed via the fringes) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The Examiner also respectfully disagrees that the hologram surface of Yin et al. must be reflective in order to form a non-planar convex/concave surface. The Examiner notes that the claims are rejected under 35 U.S.C. 103, not 35 U.S.C. 102, and that the Examiner is relying on the combination of references to teach the limitations as currently claimed. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this instance, Lowe et al. disclose that a hologram can be a reflection hologram (i.e. the hologram is formed as a mirror) [col. 4, lines 32-39]. Yin et al. teach

that a hologram can be formed as a non-planar surface (e.g. 21, photopolymer layer) wherein the non-planar surface is convex and/or concave (e.g. figures 1-4) [col. 2, lines 7-56]. As such, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the hologram substrate of Lowe et al. to have curvature, as taught by Yin et al., in order to have a reflection hologram formed on a curved surface without distorting the optical properties of the hologram layer. Thus increasing the number of applications possible for the holographic element.

Appellants argue that the proposed modification of Yin et al. would render it unsatisfactory for its intended purpose. The Examiner notes that Lowe et al. was used as the primary reference in the rejection and that Lowe et al., not Yin et al., is being modified by the secondary teachings. Accordingly, the onus is on Appellants to show that the primary reference is broken by the secondary teachings and not the inverse. Further, the general teachings of Yin et al., would not render the combination unsatisfactory for its stated purpose because the holographic recording material would still function to holographically record information. As such, Lowe et al., in view of Stephens et al. and Yin et al., teach a hologram formed as a non-planar mirror wherein the non-planar mirror is concave/convex.

Additionally, in response to Appellants' arguments that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does

not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In this instance, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the hologram substrate of Lowe et al. to have curvature, as taught by Yin et al., in order to have a reflection hologram formed on a curved surface without distorting the optical properties of the hologram layer [col. 1, lines 36-39 of Yin et al.].

B. Response to Claims 7-13 under 35 U.S.C. 103 (a) (see pages 9-10 of Appellants' brief filed 11/24/10).

With regard to the rejection of claims 7-13, in Section 5 of the Office Action dated 6/24/10, since Appellants state that the appealed claims 7-13 stand or fall together for purposes of the Appeal of the rejection under 35 U.S.C. 103 (a), the aforementioned rejections of claims 7-13 stand for the same reasons as discussed above for claims 1-6 and 14-19.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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/Jade R Chwasz/
Examiner, Art Unit 2872

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